A STUDY ON DIAGNOSTIC LAPAROSCOPY IN CHRONIC ABDOMINAL CONDITIONS

Dissertation submitted in

Partial fulfillment of regulation for the award of

M.S.DEGREE IN GENERAL SURGERY

Branch I

THE TAMILNADU

DR.M.G.R.MEDICAL UNIVERSITY

CHENNAI – 6000 004

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COIMBATORE – 641 014.

CERTIFICATE

Certified that this is the bonafide dissertation done by

Dr.ANGELINE VINCENT

And submitted in partial fulfillment of the requirement for the Degree of MASTER OF SURGERY

Branch – I (GENERAL SURGERY)

of the Tamilnadu Dr.M.G.R.Medical University, Chennai.

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DECLARATION

I solemnly declare that this dissertation on **DIAGNOSTIC LAPAROSCOPY IN CHRONIC ABDOMINAL CONDITIONS** was done by me at Coimbatore Medical College Hospital, Coimbatore under the guidance and supervison of **Prof.Dr.A.RAMAMOORTHY M.S.**

Place :

Date : **Dr.ANGELINE VINCENT**

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ETHICS COMMITTEE

CERTIFICATE

Name of the Candidate : Dr. Angeline Vincent

Course : M.S. General Surgery

Period of Study : 2007 - 2010

College : Coimbatore Medical College

Dissertation Topic : A study on diagnostic laproscopy

The Ethics Committee, Coimbatore Medical College has decided to inform that your Dissertation is accepted / ~~Not accepted~~ and you are permitted / ~~Not Permitted~~ to proceed with the above Study.

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Secretary
Ethics Committee

A STUDY ON DIAGNOSTIC LAPAROSCOPY IN CHRONIC ABDOMINAL CONDITIONS

CONTENTS

INTRODUCTION

Diagnostic laparoscopy is a minimally invasive surgical procedure that allows the visual examination and documentation of intra abdominal organs in order to detect any pathology. Diagnostic laparoscopy was first introduced in 1901, when Kelling, performed a peritoneoscopy in a dog and which was called "Celioscopy". A Swedish internist named Jacobaeuse is credited with performing the first diagnostic laparoscopy in man in 1910. He described its application in a patient with ascites and for the early diagnosis of malignant lesions. Elective diagnostic laparoscopy refers to the use of the procedure in chronic intra abdominal disorders. Diagnostic laparoscopy is safe, well tolerated and can be performed in an inpatient setting under general anaesthesia. Diagnostic laparoscopy is performed in patients to assess the diagnosis or extent of disease. Diagnostic laparoscopy in addition to giving a definitive diagnosis, reduces the operating time, postoperative morbidity and hospital stay. Hence it is cost effective.

AIM

1)To make a definitive diagnosis

2)To assess the extent of the disease.

3)To confirm the clinical and radiological finings in doubtful cases.

4)To give effective relief to the patient where possible

DEFINITION – DIAGNOSTIC LAPAROSCOPY

Diagnostic laparoscopy is a minimally invasive procedure performed in patients who have equivocal diagnosis to arrive at a definitive diagnosis.

REVIEW OF LITERATURE

HISTORY

The word endoscopy was inherited form the Greek meaning "to examing within". This term was interpreted as the examination of the interior of a deep, hollow viscus that communicates with the out sides through an orifice of the body by means of a channel through which an instrument can. be introduced.

Bazzani in 1805 first visualized the uterus with a simple tube and candle light. He was also the first to use mirror for reflection. Jacobaeus is credited with coining the word laparoscopy and he was the first to perform the procedure on a human being in 1910.

A description of the history of peritoneneoscopy is incomplete without a consideration of the development of endoscopic procedures in general.

1867 - Desormeau - described an open tulu endoscope for the

examination of Genitourinary passages. He was also the first to come up with an idea of using a small flame (light source) with a mixture of alchohol and turpentine.

1877 - Max Nitze applied the platinum wire source illumination to his

cystoscopic. He also used lens to magnify the areas to be examined. This lens system .is the fore runner of the optical system of the modern endoscopes. In 1887 he introduced miniature electric globe which was employed without separate cooling. He is called as Father of modern endoscope.

1877 - Both Nitze and Leiter introduced cystoscopes using

incandesant lamps.

1889 - Baisscau do Roacher develops separate sheath and Telescope.

He used a sheath through which multiple different telescopes could be introduced. At the end of 19th century cytoscopy and other open cavity endoscopic procedures such as proctoscopy, sigmoidoscopy, Laryngoscopy and esophagoscopy were well established in routine clinical use.

1901 - Ott was the first to introduce ventros-copic endoscopic inspection of abdominal cavity. Same year Kelling, used pneumoperitoneum on a living dog and viewed abdominal cavity with cystocope.

1910 - Jacobaeus of Stockholm first performed the procedure on a human being and coined the term laparoscopy. In 1912 he described the liver changes in cirrhosis, metastatic cancer and tuberculous peritonitis and predicted a great future for peritoneoscopy. Same year Nordentoft of Copenhagen adopted the trendelenberg position and with an inflated abdominal cavity for laparoscopy.

1920 - Orndoff of Chicago published his experience using peritoneoscope in correlation with radiological findings.

1921 - Karbsch of Berlin developed new instruments and technical ideas.. He used separate pneumo peritoneum needle and showed first coloured peritoneoscopy pictures in his lecture.

1921 - Zalikoper of Switzerland introduced carbon dioxide as a gas of choice for insufflation describing its use in comparison with other gases.

1929 - Kalk a brilliant German hepatologist. He is referred as the father of modern laparoscopy. He devised a new system of lenses and the 135 degree viewing laparoscope. He used a pneumoperitoneum needle.

1933 - Burning and Manche described their laparoscope which had 2 systems of lenses one at 180 degrees and other at 90 degrees.

1934 - Ruddock an American perfected his own laparoscope, pneumoperitoneum needle and trocar. He described ancillary biopsy instruments. He utilized air for the pneumcperitoneum. He published his results in over 2,500 cases.

1939 - Beling of New Jersey reported on indications as well as the contraindications of laparoscopy.

1952 - Endoscopic procedure was revolutionised by the introduction of cold light source by work of Fourestees, Gladder, Velmiers of Germany a method of transmitting an intense light along a quarts rod**.**

1960 – Introduction of light transmitted via fiber optic cables – cold light source.

1966 – Invention of rod lens system by British Physicist Hopkins.

1974 – Hasson devised a trocar with a blunt obturator – inserted under direct vision – open laparoscopy.

1979 - Laser first used in laparoscopic surgery by Bruhat.

1982 - Another important development was the employment of Nitrous oxide for creating pneumoperitonium which added safety compared to air and comfort when compared to Co_2.

1988 - Dubin and associates and Reddick and Olsen first popularized laparoscopic Chclecystectomy.

MATERIAL & METHODS

DESIGN OF STUDY

Time period of study	-	2007 to 2010
Age of patients	-	18 years to 70 years
Gender of patients	-	Male & Female
Place	-	Coimbatore Medical College Hospital.

INCLUSION CRITERIA

1. Chronic abdominal pain
2. Intra abdominal lymphadenopathy of unknown etiology.
3. Surgical Jaundice.
4. Ascites of unknown etiology.
5. Vague abdominal mass.
6. Subacute intestinal obstruction
7. Miscellaneous conditions.

EXCLUSION CRITERIA

•Mechanical or paralytic ileus

•Coagulopathy

•Severe cardiopulmonary disease

•Abdominal wall infection

•Pregnancy

•Generalized peritonitis

•Massive Ascites

All Patients in the study are subjected to,

a)History taking

b)Physical examination

c)Laboratory tests - CHG, LFT, Blood sugar, Renal function tests, bleeding time, clotting time.,

d)ECG

e)Radiology X-ray chest, contrast radiology if needed

f)Non invasive imaging USG, CT

g)Diagnostic laparoscopy

h) Follow up

TECHNIQUE :-

- ❖ Diagnostic laparoscopy

INSTRUMENTS :

1. Veress needle
2. Gas Insufflator
3. Distension media – Gas
4. Light source and cables
5. Trocar & cannula - 10mm, 5mm
6. Laparoscope
7. Video System
8. Ancillary Instruments : Biopsy forceps, laparoscopic retractors Flushing and suction instruments, Scissors, Clips & staples, Diathermy.

Anaesthesia:-

- General Anaesthesia

Laparoscope settings :

- Pneumoperitoneum - Co2
- Intra abdominal Pr - 12mm Hg
- Gas flow rate 1.2 L/min.

PROCEDURE :

Laparoscopic examination of peritoneal surface, diaphragm, liver, gall bladder, spleen, stomach, small intestine, colon, pelvic organs, and retroperitoneal organs. Take biopsy of any mass & collect intraperitoneal fluid for cytology.

ABNORMAL STUDY INCLUDES

- Intra abdominal mass
- Cholecystitis
- Appendicitis
- Metastatic cancer
- Fluid in peritoneal cavity
- Adhesions
- Endometriosis
- Pelvic inflammatory disease
- Occult hernia

INSTRUMENTATION

VERESS NEEDLE

The Veress Needle is an automatic needle with spring action that combines an outer sharp point, and an inner blunt stylet. The blunt stylet protrudes beyond the sharp outer point. When the needle point is driven against the lines alba or peritoneuum the inner blunt tip is pushed inside the lumen and allowing the outer sharp point to pierce these layers. Once the peritoneum has been pierced, resistance falls and the blunt tip springs out, thereby minimising the risk of damage to underlying intestine. The needle is used for the introduction of gas into the peritoneal cavity.

INSUFFLATION EQUIPMENT

The Insufflator is a unit that is attached to a tank of carbondioxide or nitrous oxide and has a separate receptacle that holds 5 liters of gas.

It can register flow rate and intraperitoneal pressure. Alternatively Boyle's anaethetic machine may be used with addition of a pressure gauge distal to the gas outlet, so that intraperitoneal pressure may be continuously measured.

TYPE OF GAS USED :

The gas of choice for pneumoperitoneum is carbon-dioxide because it is readily available, rapidly absorbed and non explosive Nitrous oxide has been used but is less

soluable than carbondioxide in the blood, is very slowly absorbed from the peritoneal cavity and supports combustion. Room air can also be used.

LIGHT SOURCE AND CABLES :

A light source of 150 watts is required for diagnostic laparoscopy. Special 1000 watt sources are available for photography. The fiber optic cable usually contains about 200,000 fibers, each 0.002 of an inch in diameter. Recently a xenon light source with variable intensity and a light filter provide better visibility at various distances.

TROCAR AND CANNULA :

The trocar and Cannula is the instrument used after the establishment of a successful pneumoperitoneum. The cannula will ultimately house the laparoscope and is usually about 1 mm greater in diameter than the trocar or laparoscope. The tip of the trocar may be conical or Pyramidal; the latter is preferred since it allows greater ease of penetration through the abdominal wall because its three-edged point aids in cutting through the tissue. Most cannulae are made of fiber glass to reduce electrical conductivity. All laparoscopic trocar cannula have a valve to prevent the leakage of gas when the trocar is exchanged for the laparoscope. The most popular being the trumpet valve type.

THE LAPAROSCOPE

The laparoscope is an indirect view type of endoscope containing optical elements that provide the surgeon with wide-angle view under magnification. A fiberoptic cable is attached to the scope and transmits light from an outside source to the scope, which

contains fiberglass filaments for further transmission of light to the distal end of the instrument. The scopes vary in diameter upto 10mm. As the size of the scope increases, the amount of light and the size of the image also increase. The laparoscope may have an objective that is directed forward,, covering an area of approximately 70 degrees, or it may be directed at a forward and oblique angle, covering an area of 135 degrees. The "forward-oblique" scope (135^0) results in a wider field of vision and does not fog as rapidly as the others. However, the wider the field, the greater the distortion at the edges of the visual field and the less the magnification. Two basic types of laparoscopes are available. The diagnostic laparoscope allows only viewing but can be used in conjunction with a second trocar and cannula inserted usually in the right lower quadrant of the abdomen to facilitate the passage of instruments for surgical maneuvers (two-port technique). On the other hand, the operative laparoscope usually employs many ports which allows for the passage of instruments useful for operative procedures

ANCILLARY INSTRUMENTS :

Ancillary instruments are usually used during surgical procedures and are generally passed through a second cannula. They can include an aspiration needle for aspiration of ovarian cysts, coagulating forceps, biopsy forceps, calibrated probe, scissors for cutting of adhesions and irrigator – aspirator, diathermy for coagulation, lysis.

TECHNIQUES

ANAESTHESIA :

Two major methods have been advocated. They include :

a) General Anaesthesia.

b) Local Anaesthesia.

a. GENERAL ANAESTHESIA

General anaesthesia can achieve the excellent abdominal relaxation necessary to avoid increased intra abdominal pressure when pneumoperitoneum is induced that leads to impaired ventilation, reduction in venous return to the heart, and regurgitation of stomach contents. Endoctracheal anaesthesia and good muscle relaxants limits the rise in intra abdominal pressure. Also, general anaesthesia with controlled respiration reduces hypercarbia and subsequent arrhythmias. Finally it allows the surgeon to perform operative procedures and no discomfort to the patient. With local anaesthesia, anaesthetizing the entire abdominal wall is impossible and the patient is often uncomfortable, operative procedures can be difficult.

General anaesthesia is the most popular of anaesthesia for laparoscopy.

ITS MAJOR ADVANTAGES INCLUDE

a. Ability to control ventilation (decreasing the natural tendency to hypercarbia)

b. Control of voluntary and involuntary patient movements;
c. Relaxation during induction of pneumoperitoneum and introduction of trocars; and
d. Elimination of patient anxiety.

ITS DISADVANTAGES ARE

a. Cost of equipment;
b. Necessity for back-up systems
c. Occasional prolonged recovery time and
d. Complications inherent to general anaesthesia.

b. LOCAL ANAESTHESIA:

Proponents of local anaesthesia for laparoscopy are less numerous but no less enthusiastic than those who advocate general anaesthesia. Many authors use local anaesthesia for atleast some of their patients.

ADVANTAGES

a. Low cost
b. Ability to use in an outpatient setting
c. Avoidance of problems associated with general anaesthesia easy adaptability and

d. Rapid awareness of certain types of complications (i.e. Co2 emboli or arrythmias).

DISADVANTAGES

a. Minimal to moderate patient d is comfort;

b. Possible anxiety;

c. Delayed treatment of certain types of complications (hemorrhage, organ perforation.

d. Necessity to explain procedures during operation.

e. Increased risk from electrical system if patient moves or breathes deeply during diathermy cogulation

f. Possible inability to completely block vagal reflexes;

g. Inability to control respiration if hypercarbia develops.

COMPLICATION OF ANAESTHESIA

Certain hazards of laparoscopy occur as a result of anaesthesia, or its interaction with the gas and electrical systems. These include the following in order of frequency :

(a) Cardiac Arrhythmias

(b) Circulstory Insufficiency

(c) Hypercarbia

(d) Gas Embolism

(e) Regurgitation and Aspiration

(f) Pneumothorax.

PREPARATION OF THE PATIENT

The anaesthetized is positioned in the supine position. With a 15^0 reverse trendelenberg tilt to view the upper abdomen. Trendelenberg position to view the pelvic organs. The bladder is emptied, abdomen is prepared with providoneiodine (Betadine) and draped.

CREATION OF PNEUMOPERITONEUM

The creation of the pneumoperitoneum is the first and most crucial step in the procedure. The purpose of the pneumoperitoneum is:

a. To provide a compartment to view the intraperitoneal structures.
b. To separate the anterior abdominal wall and bowel so that trocar may be safely inserted.
c. To provide adequate separation between electrosurgical

instruments and vital organs. The patient is placed in the 10 degree Trendelenburg position. The lower margin of the umbilicus is the site of choice for insertion of the veress needle, with deviation for special problems only. This site represents the thinnest usable portion of the abdominal wall, and it is relatively avascular. Extra long veress needles are available for very obese patients. Lower midline scars are not a contradindication to laparoscopy and rarely do such scars extend to the level of the umbilicus. If the surgeon has doubts as to whether or not a viscus may be adherent in

tnis area alternative sites are available for the insertion of the pneumooeritoneum needle.

These are the palmer's point area - 3 cm below the midpoint of left costal margin (but splenic enlargement must be determined) and the left McBurney's point, the right being avoided because of variation of the size and position of the caecum and possible appendiceal adhesions. Finally the suparaumbilical point is used.

Lane's forceps are placed on either side of the umbilicus and lifted. With a No.10 blade a low transverse incision is made in the inferior umbilical fold down to the fascia. The veress needle is held between the thumb and forefinger, placed in the incision at a 45 degree angle, and aimed at the concavity of the pelvis. The bifurcation of the aorta is usually directly beneath the umbilicus, and therefore it is essential to avoid a perpendicular penetration into the abdomen.

The needle is advanced with a quick thrust rather than a pushing motion and will result in a single pop as the needle punctures the peritoneum. The needle is manipulated to ascertain free movement of its tip.

The next step is to determine whether the needle is properly located in the

abdominal cavity. A number of manouvers may be performed to ascertain this. A drop of saline is placed at the hub of the needle. If the needle has been placed properly intraperitoneally, the drop will be sucked into the needle. Also, a syringe may be connected to the needle in an attempt to aspirate blood or liquid bowel contents. If nothing is aspirated 10 ml of saline is instilled through the cannula, which should pass freely with no resistance. Finally, the gas line is attached and insufflation begins .

As abdominal inflation begins the right hypochodrium should become rapidly tympanitic, and the abdomen should distend symmetrically. The gas should flow at a pressure of 10 mm Hg as registered on the flow meter. Usual rate of flow is 1.2 L / minute and 2 to 3 L of gas are usually sufficient. If the needle tip is incorrectly located in the intrafascial space, only the lower part of the abdomen will distend and crepitus may be noted. During the course of insufflation intra abdominal pressure should be maintained at a level of less than 12 mm Hg.

INSERTION OF THE TROCAR AND CANNULA

The most spectacular and serious accidents usually occur during insertion of the first trocar, whose diameter may reach 10 mm. First, it is important to ensure an adequate incision. If the incision is not wide enough, it is should be extended, otherwise the sleeve of the trocar will be caught on the skin margins, impeding passage of the instrument and requiring greater and usually uncontrolled force.

Next the Trendelenburg position is increased. The surgeon holds the instrument

between the index and middle fingers with the hub of the trocar resting against the then eminence. The direction of the angle is the mid line and aimed at the hollow of the sacrum. After the assistant removes the veress Needle, the trocar and sleeve are introduced through the skin incision and the instrument is guided parallel to the abdominal wall beneath the skin and subcutaneous tissue for about 3 to 5 cm. It is then directed at an angle of 45 degrees and aimed at the hollow of the sacrum. A screwing or rotary motion must be used as well as pushing one. If the direction of thrust is too horizontal the intrafascial space be entered; if the direction is too vertical the large prevertebral vessels will be endangered. As the instrument is advanced a very distant and unmistakable pop will be felt and heard. The trocar is then withdrawn and the sheath advanced for a short distance. The valve is opened manually, and a hiss of escaping gas indicates that the instrument has entered the peritoneal cavity, if the intrafascial space has been entered, the surgeon will see a hazy, foggy picture of fat and loose connective tissue with an occassional glipse of an abdominal structure. In this instance, it is important to expel as much of the carbondioxide as possible and try to reinsert the veress Needle into the peritoneal cavity.

OPEN PERITONEOSCOPY :

To avoid the complications attributable to blind insertion of trocar, the technique of open peritoneosccpy has been developed. After a 2 cm skin incision is made, the fascia is exposed and grasped with Allis forceps is elevated and incised to expose the

peritoneum. The peritoneum is incised under direct visulaisation , the sleeve is then introduced into the peritoneal cavity in direction conformed by finger palpation. Two or three towel clips are placed to approximate skin and subcutaneous tissue around the sleeve creating an airtight seal.

THE LAPAROSCOPE AND EXAMINATION

After proper insertion of the trocar sleeve, the lighted laparoscope is passed. Fogging can be eliminated in several ways. The distal lens can be prewarmed in warm saline solution, rubbed vigorously with a towel or wiped with hexachlorphene detergent cleaner (PrisoHex) or special defogging solution. If fogging continues to occur within the abdomen the lens should be touched to the peritoneum or uterus.

The two-port technique is preferred for diagnostic and operative work. The site selected for the second puncture is usually the right lower quadrant of the abdomen, although the midline above the public hairline can be used. The abdominal wall is transilluminated from within the abdomen by placement of the distal end of the laparoscope under the abdominal wall, with the lights out, blood vessels can be seen and avoided. A small incision is then made the trocar and sleeve are passed through it by the surgeon, and under direct vision the instrument is visually guided into the abdominal cavity.

For laparoscopy to have any value the surgeon should have a systematic approach to the examination of the abdominal cavity. For examination of Pelvic Organs Trendelenburg position is essential. For visualisation of liver and other upper abdominal

organs reversed Trendelenburg position and rotation to one or other side may be necessary. The anatomy of the Pelvis and abdomen as seen through an eyepiece with varying degrees of magnification and illumination and under pneumoperitoneum differs from the way it appears at laparotomy.

TERMINATION OF PROCEDURE :

After the procedure is completed, the accessory instruments are removed under direct vision.

The laparoscope is removed next, the valve on the trocar sleeve is opened and pressure is placed on the abdomen to expel the gas - The valve should then be closed to prevent air from entering the peritoneal cavity, as this is absorbed very slowly and causes considerable postoperative discomfort and shoulder pain. The defect in the line a alba is closed if accessible then skin is sutured.

INDICATIONS :

The diagnostic and operative applications of Laparoscopy are many.

Indications

1. Equivocal Mass.
2. Chronic abdominal pain
3. Jaundice
4. Ascites - minimal
5. Liver evaluation
6. Occult malignancy
7. Cancer staging - Lymphoma

PERITONEUM

Large areas of parietal peritoneum can be inspected at laparoscopy. The procedure is highly useful in evaluating patients with ascites, where simple paracentesis does not yield a clear etiology. The diagnosis of primary mesotheloma can be made, as well as metastatic malignant disease to the peritoneum and omentum. Ovarian carcinoma is the most common source of peritoneal metastases. Gastric, Colonic, Pancreatic, breast and lung cancer are other common primaries that metastasize to the peritoneum, Peritoneal metastases are safe and easy to biopsy with forceps at laparoscopy. Intra-abdominal lymph nodes are for the most part too far posterior to be observed, but large nodes containing metastatio disease can often be exposed and biopsied. Tuberculous peritonitis with chronic ascites can usually be diagnosed by direct-vision or forceps biopsy of peritoneal gxanulomas.

INTRA ABDOMINAL ADHESIONS

Intra-abdominal adhesions can be easily detected. These are usually the result of prior surgery but may be related to other inflammatory conditions. Adhesions may be flimsy or dense. These may be dealt with on laparoscopy by sharp dissection or diathermy.

The phrenicocolic ligament, left lateral triangular ligament and the falciform and round ligaments are usually identified at laparoscopy. Portal hypertension in such cases, direct manometric measurement of portal pressure can be obtained by hepatic wedge pressures, splenic pulp measurement or direct cannulation of a Portal vein after laparoscopy. Portal Venography without spleenic puncture is possible through the use of laparoscope.

Congested lymph vessels and lympatic cysts may also be evident on the liver surface. Intestinal lymphangiectasia may be evident on the visceral peritoneum of the bowel, and metastatic lesions to the serosal aspects of the stomach and intestinal tract may also be diagnosed.

SPLEEN

The spleen is mostly posterior in location, but the tip of the spleen may be seen in normal thin patients.Congestive splentomegaly from portal hypertension and splenomegaly caused by infiltrative disease will be evident, although the appearance of the splenic surface is often non-diagnostic.

PANCREAS

The pancreas was considered inaccessible at laparoscopy until 1972. Hidden deeply in the retroperitoneum there seemed no way to get at it. German laparoscopists, then developed methods to visualize parts of the pancreas using a supragastric approach. Subsequently, infragastric approaches were described. A limiting factor was interference by omental fat. Recently, an approach was described from Japan using a special laparoscope to make an omentotomy to avoid omental fat. These techniques may represent an improvement in the diagnosis of acute and chronic panceratitis where clinical tests and imaging methods have not been definitive. The diagnosis of pancreatic cancer may sometimes be made by directed biopsy at laparoscopy. Thin needle aspiration of the pancreas under computerised tomo-graphic or ultrasonic guidance is currently in widespread use. None of these methods is likely to diagnose early pancreatic cancer. Laparoscopy, however has the advantage of documenting small liver and peritoneal metastases from panoreas cancer with high degree of accuracy and can avoid an unnecessary laparotomy.

LIVER DISEASE

Solving problems in hepathology is the major indication for laparoscopy in gastroenterology. More than two-thirds of the liver surface can be rountinely examined in fine detail. Depending upon patient habitus, the pathology, and the technique 1-t is estimated that upto 80 percent of the liver surface can be visualized. Clear observations are possible in the range of 1 mm. Judgements can be made about the colour, surface character, and contour of the liver and the extent of any abnormality.

MALIGNANT LIVER DISEASE

Laparoscopy is particularly useful in diagnosing early malignant disease that affects the liver in focal fashion. Based on autopsy findings and surgical studies it has been established that about 90 percent of the time, metastatic liver disease will be evident on the liver surface. In addition, a bulge in the hepatic contour suggests an intraparenchymal lesion, and deep needle biopsies in these areas are usually diagnostic. In several series, the sensitivity of laparoscopy in detecting liver metastased was in the range of 7 0-90 percent. When radionuclide scans were used to guide biopsis the sensitivity rate of laparoscopy was 92 percent.

There are several factors that limit the diagnosis of malignant liver disease with laparoscopy. Regions of the liver that technically are impossible to see with the laparoscope include the extreme superior, the right lateral and the posterior areas.

Neoplastic disease localized in these parts of the liver is likely to be missed. In patients with previous abdominal surgery, adhesions may conceal the area of the liver containing the malignant disease. A large volume of ascites may further limit the examination of the liver surface.

Laparoscopy is a safe, well-tolerated and accurate method of diagnosing malignant liver disease. The ability to detect and biopsy small lesions makes this procedure particularly useful in diagnosing early disease and in staging.

STAGING :

Staging involves prospectively evaluating patients for the extent of malignancy before definitive treatment. Now enthusiasm for accurately staging the liver has evolved from advance in both Medical and Surgical Oncology. For example, patients with cancers from such primary sites as lung, breast, pancreas, and rectum have been spared radical surgery when early liver metastases have been documented at laparoscopic examination.

Resection of localized liver metastases, mostly of colonic origin, is well documented. The CEA test has been used to follow patients after resection of the primary colon cancer and has been used as a guide for "Second-Look" surgery. Laparoscopy may be useful here to document clearly unresectable liver metastases and avoid repeat laparotomy.

HODGKIN'S DISEASE :

The diagnosis of Hodgkin's disease metastasizing to the liver is important in planning therapy since visceral or stage IV disease is always an indication of chemotherapy rather than radiotherapy alone. A staging laparotomy can be avoided if liver disease is proven by biopsy. In early Hodgkin's disease laparoscopic biopsy has tripled the diagnostic yield of percutaneous biopsy.

NON HODGKIN'S LYMPHOMA :

Laparoscopy also can increase accuracy in diagnosing Ncn-Hodgkin's Lymphoma metastatic to the liver. The lymphomas are often multifocal when diagnosed, and do not follow a regular progression as does Hodgkin's disease. The histologic findings play a more important role in deciding on treatment than in Hodgkin's disease. In Non-Hodgkin's lymphoma, laparoscopic biopsy has more than doubled the yield of percutaneous biopsy.

PRIMARY LIVER CANCER :

Laparoscopy has been found to be highly effective in obtaining a biopsy-proven diagnosis of primary liver cancer. Hepatocellular cancer is often characterized by extensive vascularity, and a choice of biopsy site can be a made away from large surface vessels. Postbiopsy bleeding can be controlled under direct vision. In staging primary hepatocellular carcinoma for surgical resection, the liver is examined for a

single, localized neoplastic focus. If the carcinoma appears resectable, it is prudent not to obtain a biopsy specimen in order to avoid the risk of spreading malignant cells. If both liver lobes are diffusely involved with multifocal disease, biopsy specimens can be taken and a laparotomy can be avoided. Hepatocellular carcinoma developing in cirrhotic patients is often diffuse or multifocal at presentation.

Severe cirrhosis often precludes major hepatic resection in any case. Peritoneal or diaphragmatic metastases and malignant ascites, which confirm unresectability may also be detected at laparoscopy.

CIRRHOSIS

It is in the diagnosis of Cirrhosis that laparoscopy has been most useful when there is suspicion of chronic liver disease. Percutaneous needly biopsy has been widely used to diagnose cirrhosis. In a review of the English and German Literature by Nord, percutaneous biopsy had an average false-negative rate of 24 percent.

With visual and histological diagnosis, combined, however, the average false-negative rate for laparoscopy decreased to 9 percent. Percutaneous biopsy is the simpler and cheaper method and this fact must be balanced against the importance establishing the diagnosis of cirrhosis in a particular patient

Laparoscopy also has the advantage of excluding other hepatic lesions. The differentiation between cirrhosis and hepatic neoplasm is a frequent problem. In patients referred for laparoscopy with suspicion of liver neoplasm, is a frequent problem. In patients referred for laparoscopy with suspicion of liver neoplasm, cirrhosis was the most common benign diagnosis. Various scans and percutaneous biopsies are often unable to confirm cirrhosis or rule out neoplasm. Laparoscopy has been highly successful in making an accurate diagnosis in this setting. The procedure is similarly useful in the cirrhotic patient who undergoes clinical deterioration, where hepatocellular carcinoma is suspected. A serum alphafetoprotein elevation strongly suggest the diagnosis, but is not always present

and histological confirmation is still desirable. In primary hepatocellular carcinoma, neoplastic areas, can be differentiated from regenerating nodules at laparoscopy and directed biopsies are usually sufficient to make a firm pathological diagnosis.

GALLBLADDER, JAUNDICE

Gallbladder can be examined visually and a diagnosis of chronic choleoystitis and sometimes carcinoma of the gallbladder can be made. In obstructive Jaundice the liver will have a red-green mottled color, and there may be a markedly distended "Courvoisier Gallbladder". In intrahepatic cholestasis and hepatic duct carcinoma, the gallbladder is collapsed. Jaundice is now usually worked-up by ultrasonography computerised tomography, endoscopic retrograde cholangiopancreatography or percutaneous cholangiography & MRCP.

In obstructive jaundice that appears to be caused by malignant disease, however, laparoscopy may be a means to obtain a tissue diagnosis of liver or peritoneal metastases. Laparotomy can then be deferred in selected patients and the obstructive jaundice treated by endoscopic or percutaneous drains or stents.

OTHER SPECIFIC USES IN GASTEROENTERIOLOGY

It is also of great benefit in the management of the patients with chronic as recurrent abdominal pain. The overall diagnostic rate is influenced if there are objective pre-operative findings when it approximates to 9 0-95 percent.

In 102 patients with chronic persistent abdominal pain and negative gastrointestinal investigation including endoscopy and contrast radiology, significant pathology was found in 25 at peritoneoscopy (Wood & Cuschieri - 1979). This included inflammatory bowel disease in 5 patient and intra abdominal malignancy in 7.

LAPAROSCOPY FOR NON-PALPABLE TESTICLE

Laparoscopy has been used since 1976 for the evaluation of the non-palpable testis. The rationale for the procedure has been to decrease the morbidity of open standard surgical exploration for the non-palpable testicle. Furthermore, therapeutic intervations such as orchiopexy and orchidectomy are also feasible using this technique.

Diagnostic laparoscopy identifies the location of a nonpalpable testis with 99-100% accuracy. The procedure reliably demonstrates whether the testicle is present intra-abdomainlly or whether the vas and the vessels enter the internal inguinal ring. When laparoscopy is applied only for diagnosis, it can still prevent unnecessary abdominal explorations in 13-18% of patients. Laparoscopy by a skilled laparoscopist enables therapeutic intervention, minimizes the need for open explorations, and preserves the benefits under anesthesia prior to laparoscopy may identify up to 18% of nonpalpable testicles in the groin.

Diagnostic laparoscopy should be part of the treatment algorithm of patients with nonpalpable testcs as it is likely to improve patient outcomes.

CONTRAINDICATIONS :

The contraindications to laparoscopy are few but do exist. Generalised peritonitis and ileus are absolute contraindications because of the risk of injury to the bowel. The danger of hernia, particularly umbilical, lies inadvertent injury to the contents of the sac.patients with known diaphragmatic hernias are at risk because of potential embarrassment of cardicpulmonary function. Finally, some patients with severe cardiac and respiratory disease, which precludes the use of general anaesthesia, are at great risk because of potential superimposed hypercarbia and subsequent arrhythmias.

It is doubtful whether acute salpingitis not associated with peritonitis and ileus is a contraindication to laparoscopy. Obesity, age, and previous laparotomy scars are not necessarily contraindications to laparoscopy. These have been classified under relative contraindications and depend largely on the experience of the individual surgeon.

COMPLICATIONS :

Despite the low mortality and morbidity associated with laparoscopy the occassional occurrence complications indicates that the procedure is not without risk. Mortality has been reported to be 0.1 to 0.2 percent.

MAJOR COMPLICATIONS OF LAPAROSCOPY

PNEUMOPERITONEUM

1. Gas Emboli Cardiac arrest

2. Pneumothorax, pulmonary edema,
3. Ventilatory insufficiency.
4. Haemorrhage
5. Perforation of viscus
6. Subcutaneus emphysema
7. Hypotension

TROCAR INJURIES

1. Gastrointestinal injuries
2. Major vessels injuries
3. Urinary tract injuries
4. Wound dehiscence, incisional hernia

ANCILLARY INSTRUMENTS :

1. Diathermy injury to bowel
2. Bleeding

The major complications that have occured with laparoscopy are listed in above Table. Complications during the creation of the pneumoperitoneurn with the veress needle have been reported to occur with an incidence of 7.4 per 1,000 cases.

Gas emboli are related to the insufflations of gas into a vein- . In a study of 642 complications six deaths ware attributed to gas emboli. Bruhl reviewed 63, 845 diagnostic laparoscopies and found only one instance of gas embolus in 159 4 serious complications. Although this complication has been reported it has generally not been proved unless the gas was injected directly into a vein. Characteristically , sudden and. profound hypertension will occur, and a mill wheel murmur will be heard over the pericardium.

Cardiac arrest has occurred at a rate of 1 per 2,000 procedures, which has resulted in death at the rate of 1 per 8r000 procedures. Deaths are related primarily to cardiac arrhythmias and hypoxia. Hypercarbia occurs as a result of hypoventilation or because of absorption of carbondioxide from the peritoneum. Virtually all patients exhibit a significant rise in arterial PaCo2 and hypercarbia develops, This reaction can be minimized by adequate controlled endotracheal ventilation. Controlled hyperventilation may reduce the risk of hypercarbia. The Trendelenburg position and overdistention of the abdomen may result in hypoxia. Increased intra-abdominal pressure, can result in a decrease in central venous pressure, systolic pressure and cardiac output. Also, over

distention of the abdomen and irritation of the peritoneum by insufflating gas can result in a vasovagal response that will lead to hypotension and hypoxia.

Pneumothorax, another potentially serious complication associated with pneumoperitoneum can result in hypoxia. The gas may dissect retroperitoneally through congential foramina and result in pneumo-mediastinum or it may enter the chest cavity through defects in the diaphragm or weak points of the aortic and esophageal hiatus.

Since the Veress needle and the trocar must be introduced blindly into the abdominal cavity, penetrating injury to the intestimal tract can result. The incidence has been reported as 1 to 2.7 per 1,000 patients. Injury to the bladder has occurred with the veress needle usually poses no problem, and the needle can be removed and another attempt made to establish a pneumoperitoneum. However trocar injury is much serious. If this occurs, the trocar should be left in place so that the injury can be identified; otherwise at laparotomy the surgeon will be looking for a 1 cm laceration in 24 feet of intestine.

Injury to major vessels aorta, venacava, and iliac vessels is the most dreaded complication of laparoscopy.

The incidence of thermal injury to the gastrointestinal tract is about 0.2 percent. These burns occasionally felt of contact of the bowel with the ancillary forceps, when

the electrons jump to nearby bowel (Spark gap phenomenon) or when active electrode makes contact with the laparoscope or trocar sleeve and the intestine is in contact with them. These complications can be avoided with the use of low voltage, high frequency generations, insulated instruments and bipolar forceps.

Finally bleeding may be a problem during ancillary maneuvers, such as those associated with biopsies, avulsion of the fallopian tube, or mesosalpingeal tears. Bleeding at the site of the insertion of the veress needle presents no problem, but on occasion bleeding at the site of the second trocar may be troublesome, particularly if the inferior epigastric vessels are injured.

OBSERVATION AND RESULTS

TABLE – 1

S.NO.	MODE OF PRESENTATION	NO OF CASES
1	Chronic abdominal pain	23
2	Sub Acute Intestinal Obstruction	10
3	Loss of Weight Loss of appetite	7
4	Occult Hernias	3
5	Faecal fistula	1
6	Jaundice	2

TABLE – 2

S.NO.	CLINICAL ABDOMINAL FINDINGS	NO OF CASES
1	Tenderness	16
2	Mass Abdomen	2
3	Hard nodular Hepatomegaly	3
4	Ascites	2
5	Absent testes in Scrotum in normal position	3

TABLE – 3

S.NO.	EXTRA ABDOMINAL	NO OF CASES
1	Enlargement of Virchow's node	1
2	Jaundice	2

TABLE – 4

S.NO.	TYPES OF ANESTHESIA	NO OF CASES
1	General Anaesthesia	30

TABLE – 5

S.NO.	Laparoscopic Findings	NO OF CASES
1	Adhesions	6
2	Enlarged mesenteric nodes	5
3	Tubercles over mesentry, peritoneum	4
4	Nodules over liver	2
5	Intra abdominal testes	2
6	Secondary Deposits over peritoneum	1
7	Malrotation of gut	1
8	Intusussception	1
9	Richter's hernia	1
10	Absent Gall bladder	1
11	Mass in RIF (Complex)	1
12	Persistent Vitellointestinal band	1

TABLE – 6

S.NO.	NO OF BIOPSIES	NO OF CASES
1	Enlarged mesenteric / Paraaortic node / Tubercles	
2	Nodules over liver	3
3	Mass in RIF (Complex)	1
4	Secondary Deposits over peritoneum	1
	TOTAL	11

TABLE – 7

TOTAL NO OF CASES	TOTAL NO OFCOMPLICATION
30	NIL

DISCUSSION

The most common indication for diagnostic laparoscopy is chronic abdominal pain. In my study 23 patients presented with chronic abdominal pain. The diagnosis was established in all but one patient. 9 patients presented with features of subacute intestinal obstruction. 7 of these patients had post operative adhesions as the cause of the subacute intestinal obstruction. One patient had persistent vitellointestinal band. One patients had partial malrotation of the gut. Another patient had intusussception. Of the 7 patients who presented with loss of appetite and loss of weight 4 had TB abdomen. 2 patients had hepatocellular carcinoma.

Two patients presented with mass abdomen and 1 proved to be endometriosis and 1 patient had hyperplastic ileocaecal tuberculosis. Of the 3 patients who presented with nodular hepatomegaly two had hepatocellular carcinoma and one patient had cirrhosis of the liver. Jaundice was the indication for diagnostic laparoscopy in 2 patients and they proved to have hepatocellular carcinoma on liver biopsy.

Two patients had minimal ascites and fluid aspirated for cytology showed adenocarcinoma cells in one patient. Diagnostic laparoscopy showed nodular hepatic surface and biopsy proved the case as hepatocellular carcinoma.

In 3 patients with absent testes in the normal scrotal position, diagnostic laparoscopy revealed intra abdominal testes. 3 patients presented with occult hernia and two were proved to be congenital hernias on diagnostic laparoscopy.

One patient presented with faecal fistula and a Richter's hernia was seen on diagnostic laparoscopy. Diagnostic laparoscopy was performed in 30 patients and the objective Diagnosis was established in 18 patients by Diagnostic laparoscopy alone. Biopsy along with Diagnostic laparoscopy established the diagnosis in 11 patients. The procedure did not provide a diagnosis in one patient. In three patients laparotomy was resorted to following Diagnostic laparoscopy. There were no complications observed.

CONCLUSION

Totally 30 diagnostic laparoscopies were done in my study. Diagnostic laparoscopy alone established the diagnosis in 18 patients (60%) Diagnostic laparoscopy and biopsy established the diagnosis in 29 patients (97%). Diagnostic laparoscopy failed to yield a diagnosis in one patient (3.3%) These figures indicate the sensitivity (97%) of this procedure. Its value is higher in malignant than inflammatory lesions because of extensive adhesions met in the latter condition. In 10 patients who would ordinarily need exploratory laparotomy had the same information gained by the use of, diagnostic laparoscopy. The fact that 97% diagnostic confirmation achieved in our series speaks for the advantage of laparoscopy as a diagnostic tool in chronic abdominal conditions. The P Value < 0.01 Though an invasive procedure Diagnostic laparoscopy is easy to perform and safe in expert hands.

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PROFORMA

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COMPLAINTS:

H/O PRSENTING COMPLAINTS:

PAST MEDICAL / SURGICAL HISTORY:

PHYSICAL EXAMINATION:

INVESTIGATIONS:

LAB TESTS
RADIOLOGY
X-RAY CHEST /ABD
USG ABDOMEN
CT ABDOMEN

DIAGNOSTIC LAPAROSCOPY:

HPE
TREATMENT
CONCLUSION